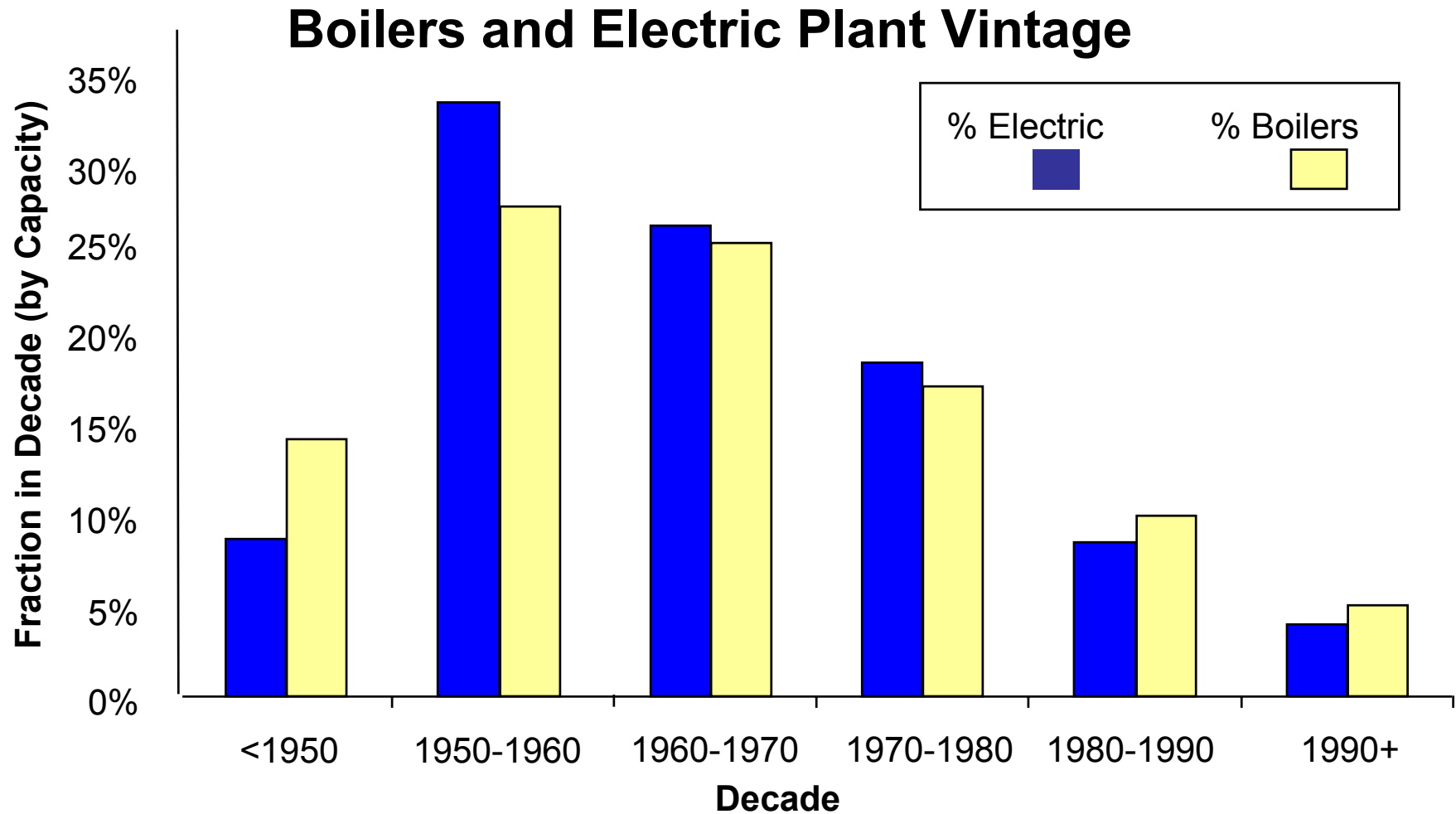


Regulatory Education & Outreach for New Technologies

Offices of: Distributed Energy & Electric Reliability, Solar/PV, Fuel Cells & Hydrogen, Building Technologies

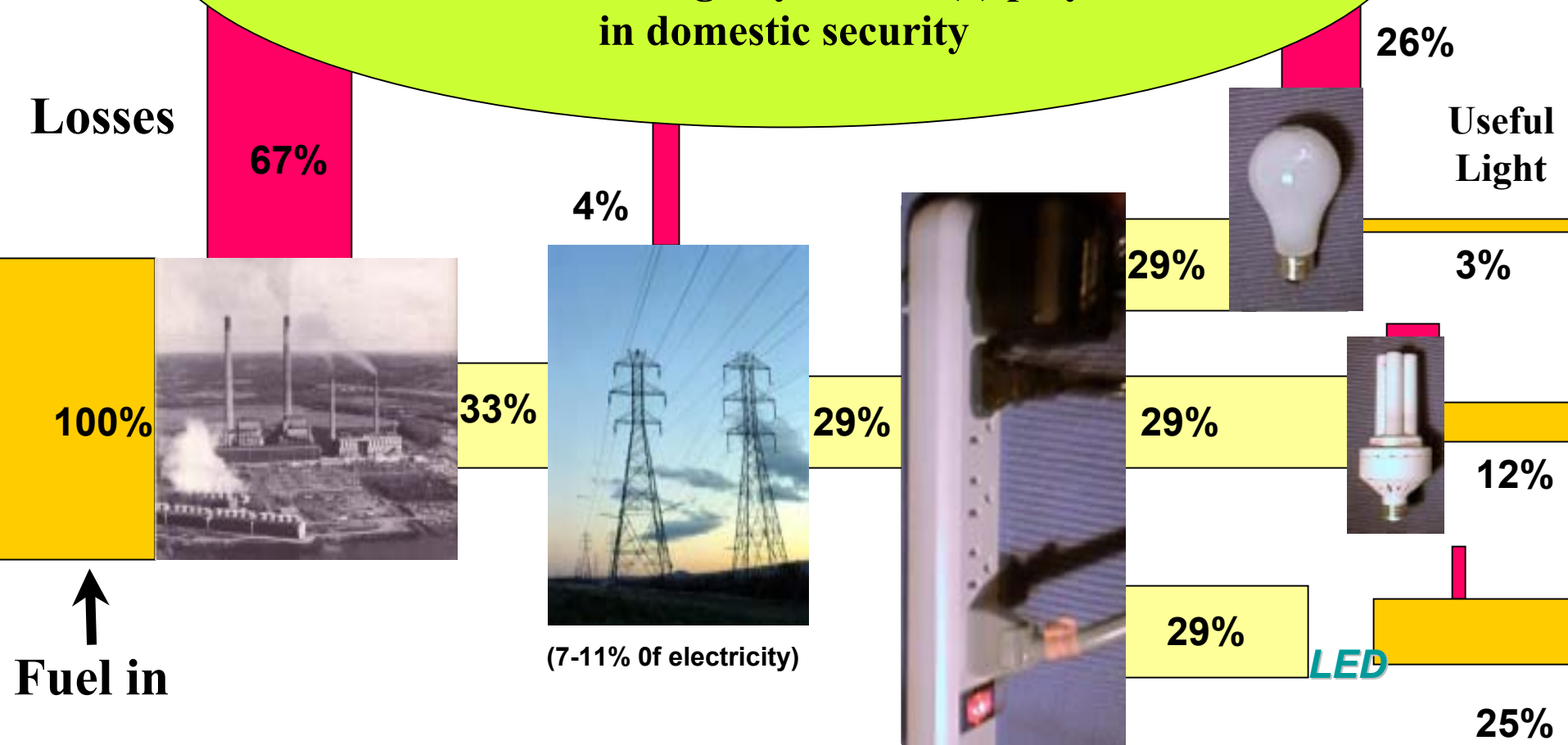
U.S. Department of Energy

Aging Heat & Power Generation

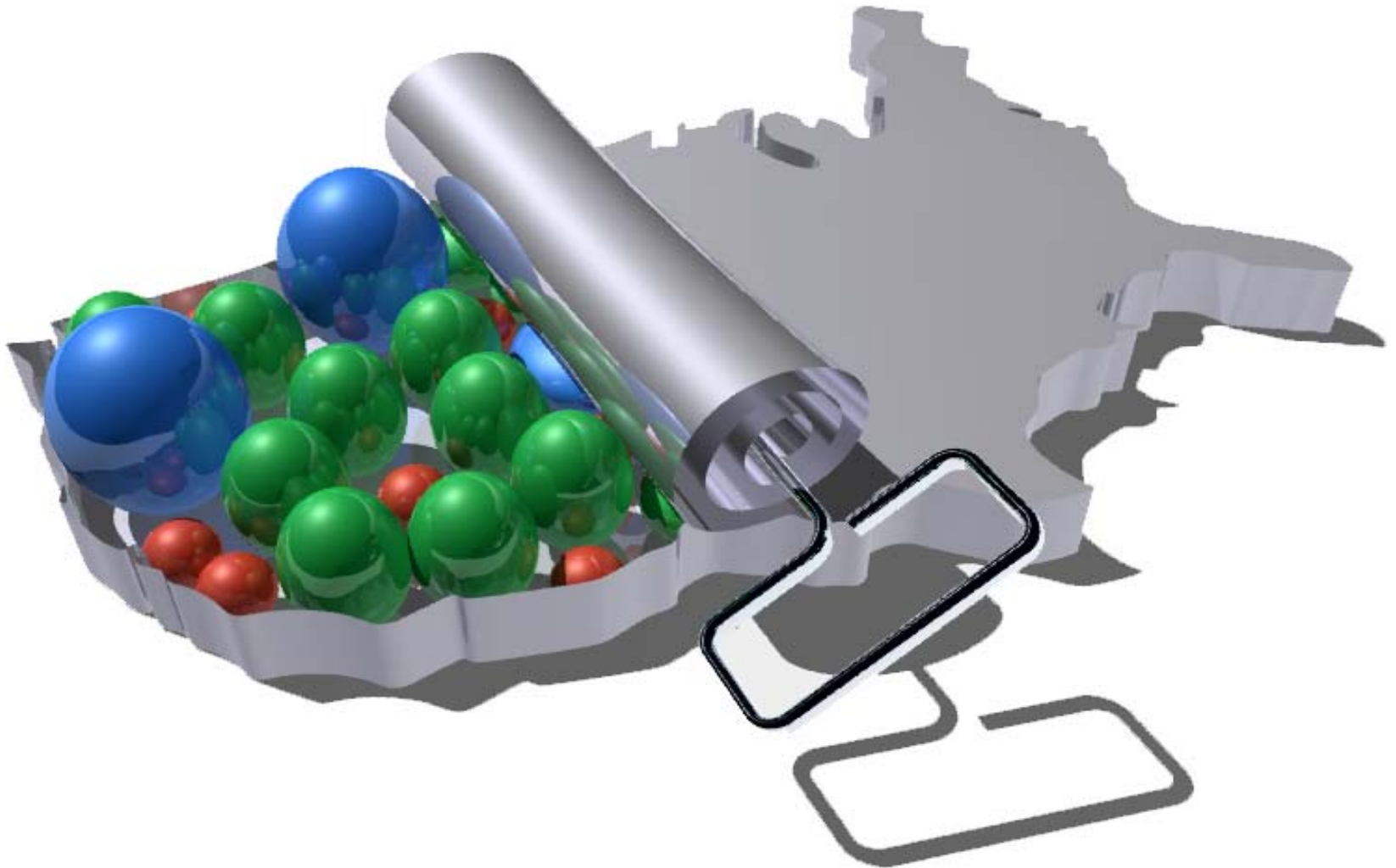


Sources: Energy Information Administration, Gas Research Institute

The current energy delivery system is up to 97% inefficient; this (1) impacts the cost of business in the U.S., (2) affects the price of electricity, heating and air conditioning to you, and (3) plays a role in domestic security



***U.S. consumers are getting
smarter.....***



The Federal Role

The DOE does not REGULATE energy (your state utility commission does that); it furthers the Administration's goals by:

- ✓ long-term R&D programs
- ✓ Technical and economic analyses, public and regulatory education programs

Offices of: Distributed Energy Resources; Fuel Cells & Hydrogen Infrastructure; Solar Technologies; Building Technologies.....

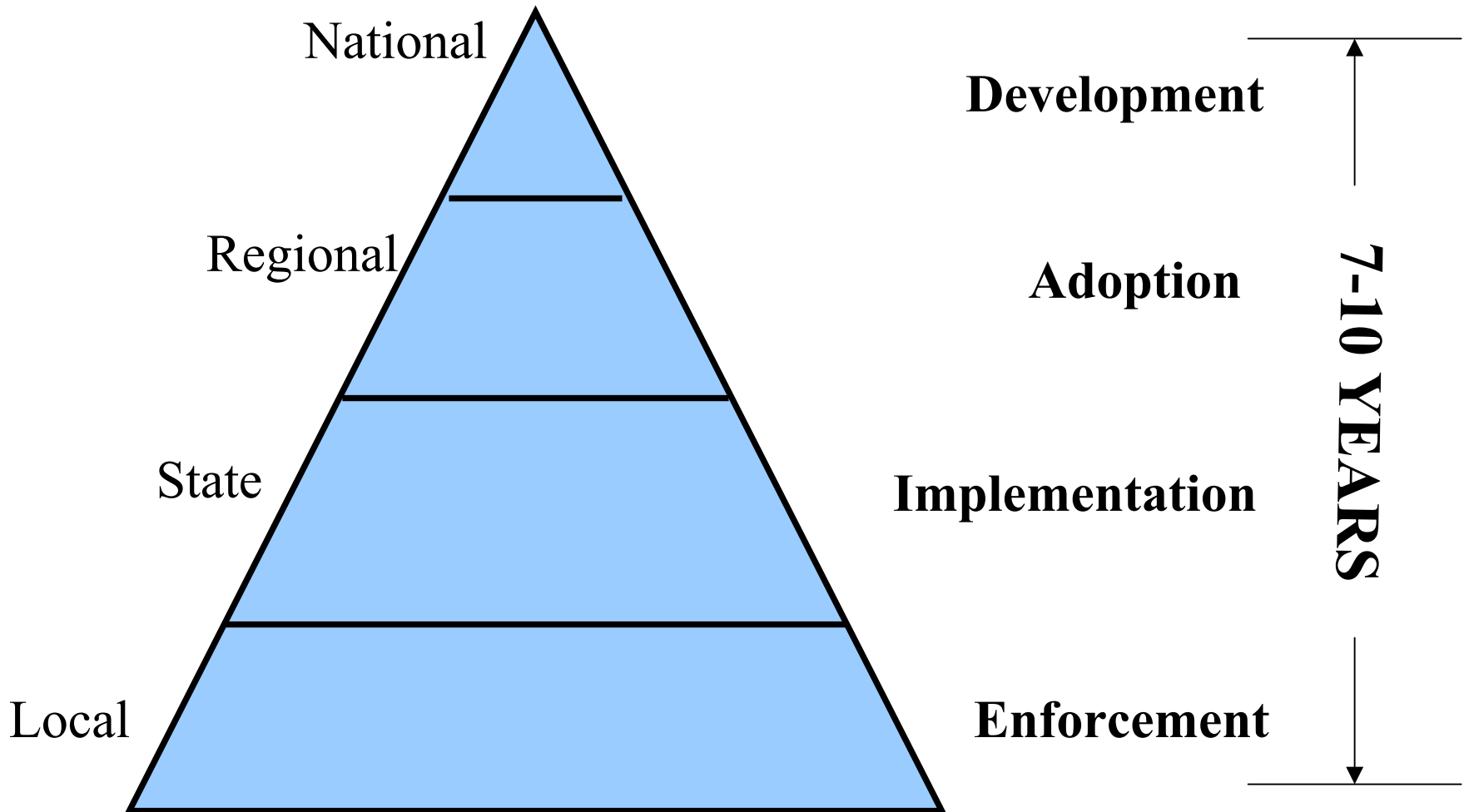
- Microturbines, reciprocating engine generator sets, fuel cells, solar heaters & photovoltaic systems
- Materials, energy storage, power electronics
- Fuel production systems, transmission & storage
- Combined heat and power (CHP), “power parks,” building cooling, heating & power (BCHP, thermally-activated technologies)
- Equipment, bldg. and electrical interconnection standards; communications & control

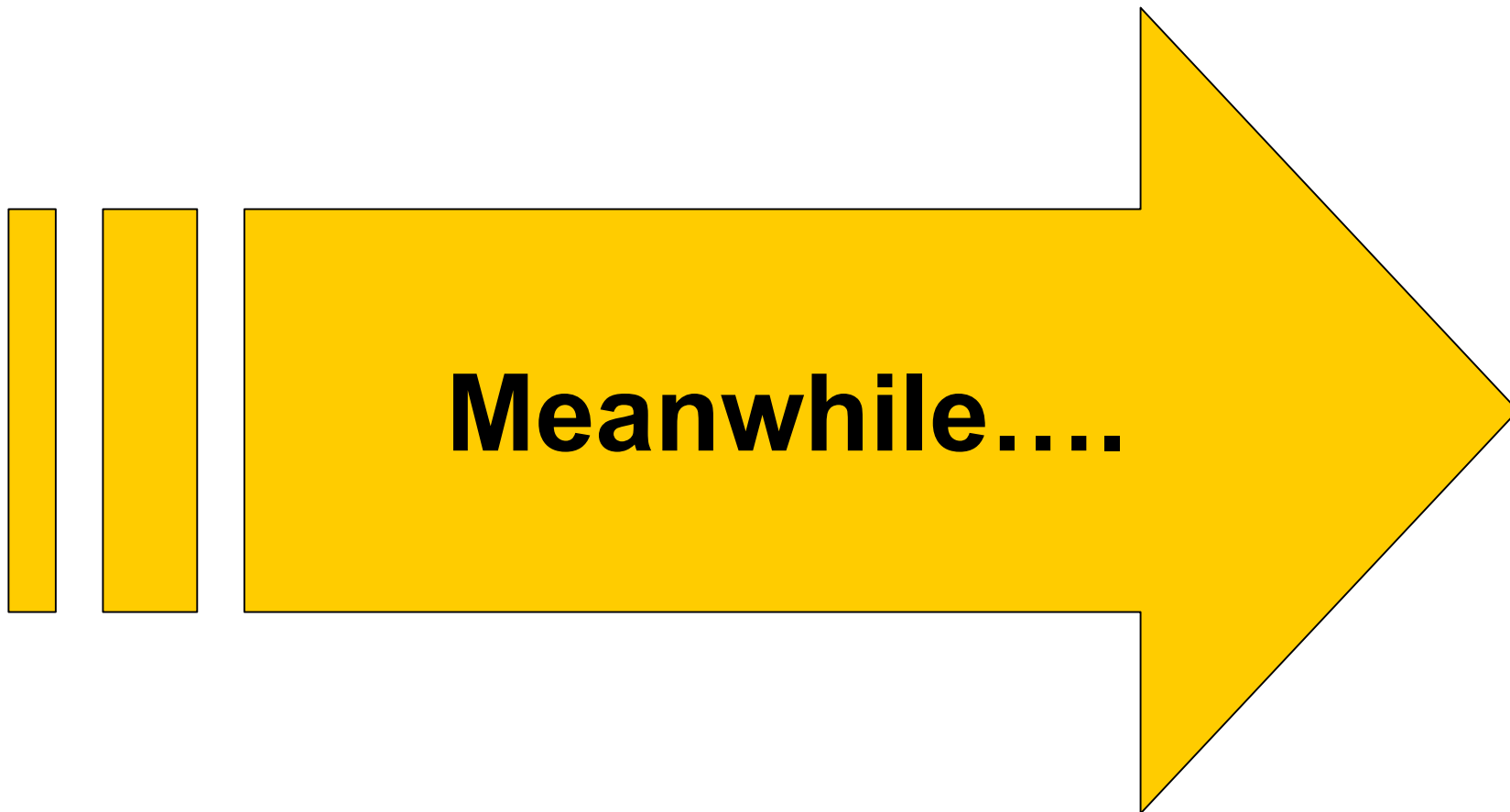
DE Codes & Standards

U.S. DOE Program Support

- Fuel Cells/Hydrogen, Neil Rossmeissel, Tel: 202-586-8668 neil.rossmeissel@ee.doe.gov
- Microturbines, Debbie Haught, Tel: 202-586-2211 debbie.haught@ee.doe.gov
- BCHP, Ronald Fiskum, Tel: 202-586-9154, ronald.fiskum@ee.doe.gov
- Electrical Interconnection, Richard DeBlasio (NREL), 303-275-4333, deblasid@tcplink.nrel.gov
- State & Local Education/Outreach, Anne-Marie Borbely-Bartis (Battelle), Tel: 202-586-5196, anne-marie.borbely-bartis@ee.doe.gov

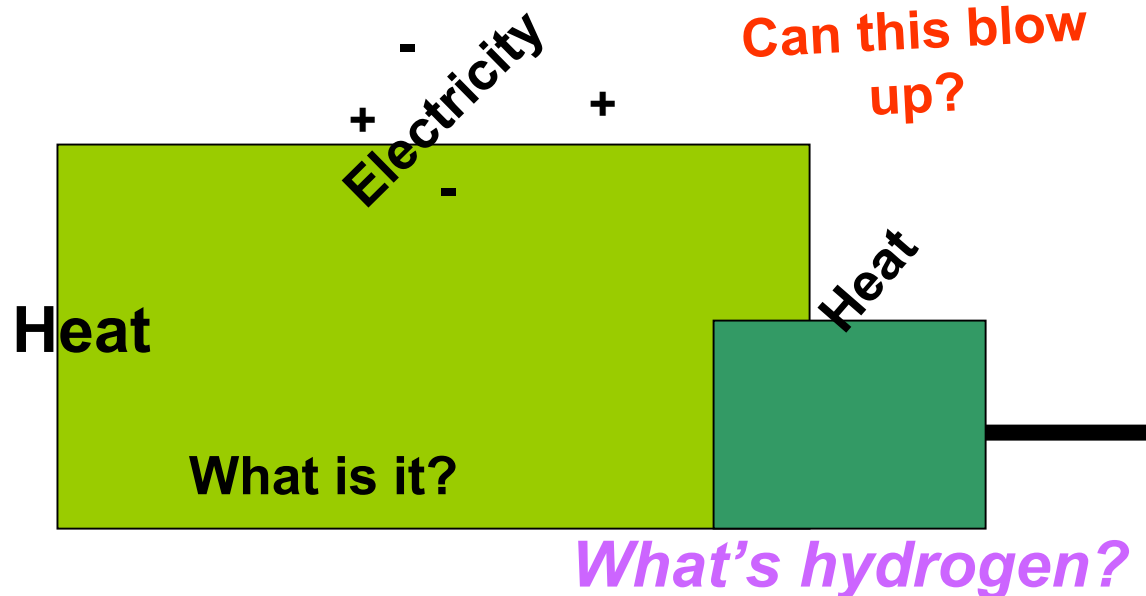
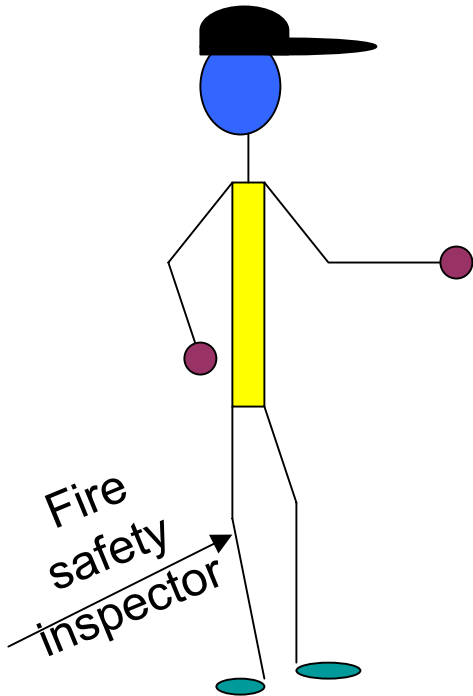
From National Standards to Local Building Codes:





“Am I on
camera?.... Is this
one of those
hidden camera
shows?”

**Actual fuel cell permitting
experience
(location omitted)**



Case Study: Microturbine

- 30-kW Microturbine (natural gas fired)
- “Benign” emissions signature (low NO_x)
- Grid-parallel, grid-independent
- UL2200 Certification
- Certified under NY State Interconnection Guidelines

Case Study – Microturbine, cont.

- Fargo, ND – Holiday Inn & Conference Center
 - 1 30-kW unit (M330-SA) with Unifin heat recovery system
 - Installed inside bldg., in mechanical room
 - Utilizes “low pressure” natural gas (11 lbs.)
 - No electrical interconnection with grid
 - Feeding all electrical and thermal output directly into boiler

Case Study – Microturbine, cont.

Action	Cost (\$000s)
• Upgrade 50 yds. Natural gas pipeline (1 lb. To 11 lbs.)	4.0
• Mechanical inspector required:	
all pipeline connections to be welded	3.0
VF drive for additional combustion air into room	6.0
new chimney to outside	3.0
• Electrical inspector required:	
Grounding only	n/a
• Additional modem phone line	n.a
• Engineering labor and materials	14.0
Total Installation estimate:	30.0

Case Study – Fuel Cell

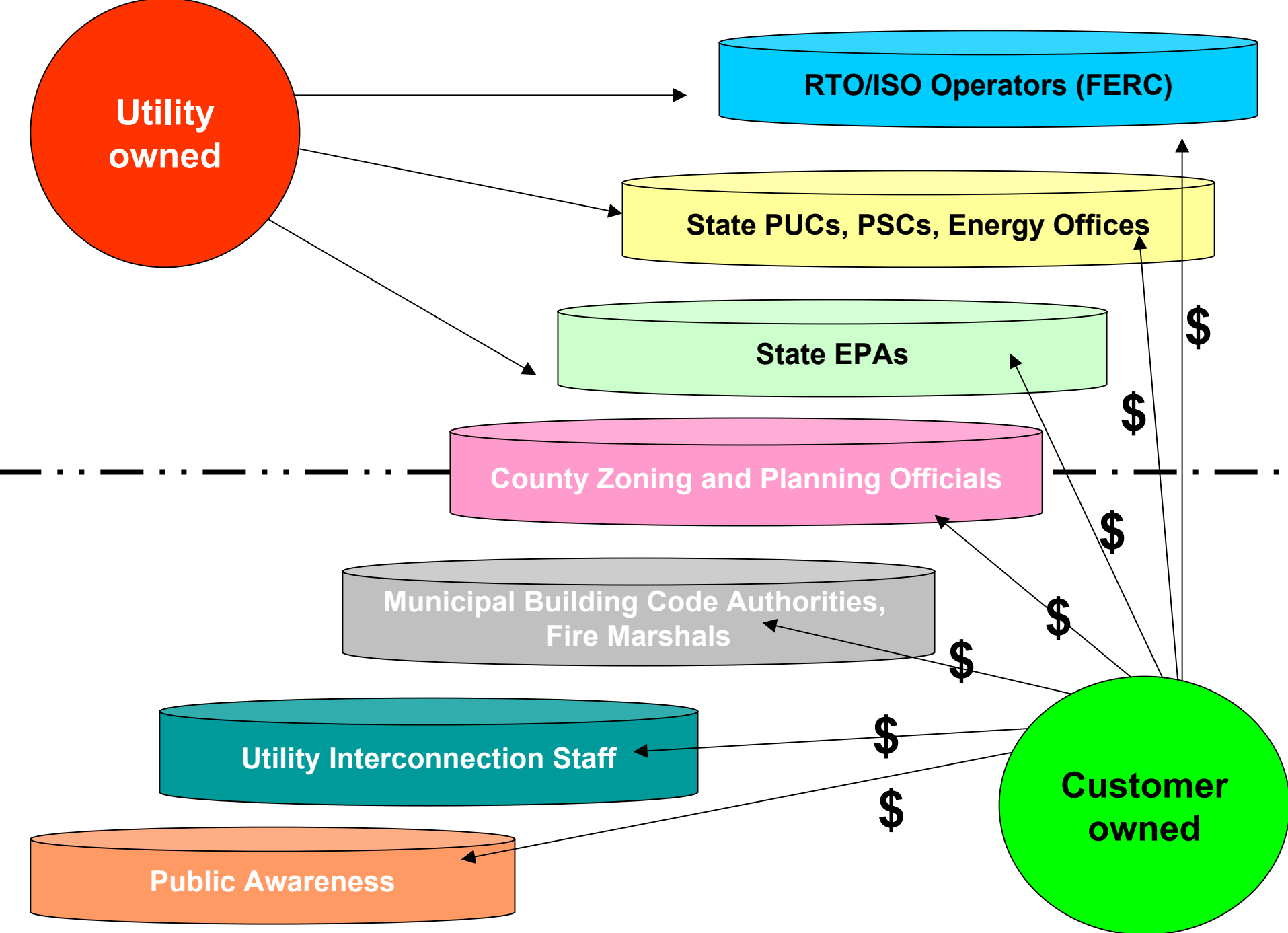
- 2-5kW PEM fuel cell system and fuel reformer
- Utilizing methanol as feedstock on first units
- 300-gallon “tote” retrofitted as onsite storage tank, piping system
- Relevant code: NFPA 30 and 30A, Combustible Liquid Fuels
- BPA has funded 110 alpha and beta units, currently installing first 10 units across Pacific Northwest

Case Study -- Fuel Cell, cont.

- Fire Marshals in urban areas requiring the following on methanol systems:
 - Additional setbacks from walls, doors, windows, public access
 - Automatic shut-off valve during periods of no demand
 - Signage, fire extinguisher
 - Tank must be fenced, protected from vehicular impact
 - All pipes that enter building must be welded; all invisible joints must be welded

Case Study – Fuel Cell, cont.

- Methanol fuel system requirements, cont:
 - 12-ft. ventilation stack
 - Emergency relief venting system – 18-in. manhole w/loose bolts
 - Seismic calculations
 - Secondary containment system
 - Sight glass on storage container
 - Static electricity management system – grounded tank, toad, etc.
 - Pressure test on all pipes and tanks, with Fire Marshall observing
 - Road uneven – must be re-graded



So.....

***Welcome to the U.S. DOE
Road Show!***

ASK QUESTIONS

Ask questions ask questions ask questions ask questions ask